JPRS 77410

18 February 1981

China Report

SCIENCE AND TECHNOLOGY

No. 83

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NATIONAL DEVELOPMENTS

SICHUAN BEGINS RELIEF WORK AFTER EARTHQUAKE

OW270436 Beijing XINHUA Domestic Service in Chinese 1631 GMT 26 Jan 81

[Text] Chengdu, 26 Jan (Xinhua)--In the wake of the serious earthquake, the people of all nationalities in Daofu County, Sichuan Province, have united as one and plunged into an antiquake relief struggle under the leadership of the party and the government.

A strong earthquake occurred in Daofu County on the morning of 24 January. The quake was followed by continuous aftershocks. With these circumstances in mind, the Daofu County CCP Committee held an emergency meeting in its courtyard, which was surrounded by debris, to plan for relief work. Then cadres were sent by the country's antiquake relief work command to investigate the state of the disaster at various places and to organize the rescuing of injured people. They helped the masses move out of dangerous houses and, at the same time, made arrangements for their everyday life. Two leading cadres of the Daofu County CCP Committee worked persistently day and night to lead the relief work, ignoring the fact that their own houses had been toppled in the quake. As for other cadres, some had houses badly damaged or knocked down and others had dependents injured, but they all stood fast at their posts and applied themselves wholeheartedly to relief work.

Relief work in Daofu County quake-afflicted areas received active support from all other places in Sichuan Province and from the pertinent departments of Garze Tibetan Autonomous Prefecture and the People's Liberation Army. To date, they have dispatched 16 medical service teams to Daofu County to join rescue work and to treat the injured. With support from the postal and telecommunication departments and other units concerned, quake-damaged telecommunication lines linking Daofu with Chengdu and Kangding were repaired on 25 January. Tents, medicines, food and other relief supplies are being sent to Daofu from Chengdu, Yaan, Kangding and other places. A PLA air force plane today dropped the first batch of relief supplies to the quake-afflicted areas of Daofu County.

In the urban area of Daofu County, which was badly hit by the quake, 20 percent of the houses collapsed, while most of the rest are tilting or cracked as a result of the tremors. All people in the urban area have now moved out of dangerous houses; 150 tents have been erected and 40 shelters improvised in this area to house the old and weak as well as women and children. Relief supplies, including dried foods and Tibetan-type prepared foods, have been distributed to the masses. All the injured have been given medical treatment, and more than 30 persons who were badly injured have been sent elsewhere for treatment.

CSO: 4008

APPLIED SCIENCES

PRC SCIENTIST ON EFFECT OF 1982 SOLAR ALIGNMENT

OW010830 Beijing XINHUA in English 0819 GMT 1 Feb 81

[Text] Beijing, February 1 (Xinhua)--The view of some Chinese scientists that the alignment of the nine planets in the solar system in 1982 will not affect the climate on the earth has been challenged by Ren Zhenqiu, an associate researcher of the Institute of Meteorology under the Central Bureau of Meteorology.

In an interview, the scientist predicted that the planetary alignment will be responsible for fairly frequent natural disasters in the northern hemisphere in the coming 20 years or so.

He disagreed with a group of astronomers at the Nanjing-based Purple Mountain Observatory who have said that the tide-raising force of the nine planets in alignment will be too insignificant to cause major climatic or seismological reactions.

In cooperation with Li Zhisen, an associate researcher at the Beijing Observatory. Ren Zhenqiu since 1978 has been researching records concerning the influences of planetary alignment on the earth's climate over the last 5,000 years.

Ren Zhenqiu said that the influences span about 25 years before and after the year of planetary alignment.

The next alignment is due in winter next year, Ren said, this follows a historical pattern since the climate in China and the northern hemisphere at large has been colder than normal and there have been major floods, droughts and earthquakes.

According to Ren, three of the four major floods in the Yellow River basin in the last 500 years and four earthquakes measuring about seven degrees on the Richter scale in North China in the last 1,000 years happened around the time of the planetary alignments.

"So, we must be on guard against the possible emergence of natural disasters," he said. "On the other hand, there is no reason for anxiety. It will be just the same as the low temperature period in the 19th century."

CSO: 4020

PRC SEISMOLOGISTS STUDY EARTHQUAKE INDICATORS

OW201540 Beijing XINHUA in English 1519 GMT 20 Jan 81

[Text] Beijing, January 20 (Xinhua)--Chinese seismologists have shared recent findings and summed up their work at a symposium on earthquake prediction which closed today in Beijing.

A central theme has been the importance of abnormal phenomena in ground water and gas as earthquake signs.

According to associate research Professor Cai Zu Huang, a specialist in water and gas at the state seismological bureau, this type of observation may be a major means of predicting earthquakes, although not the only one. Many questions remain unanswered in this field, he said.

Data from some 60 quakes since 1966 (including seven registering more than seven on the Richter Scale) indicate that before a quake the ground water level lowers and then rises, sometimes so quickly that water gushes from wells. At the same time, water temperature and pressure also change.

The data shows that chemical elements dissolved in ground water vary prior to a quake. The density of radon, hydrogen and other gases increases, and concentrations of ions of fluorine, chlorine, and calcium rise. In live fault zones where there is a concentration of stress, the density of some gases in the soil also rises sharply.

To keep constant watch for these signs, a network of water and gas observatories has been formed. So far 400 wells and spring in the Beijing-Tianjin-Tangshan area and Ningxia-Gansu-Sichuan-Yunnan earthquake zone are being watched for this purpose. Oil wells can also be used.

The past few years have witnessed some successes in the use of ground water and gas predictors. Warnings based on these signs have forecast three quakes over magnitude seven that shook Haicheng County in Liaoning Province, Longling County in Yunnan Province, and Songpan County in Sichuan Province, allowing residents to take proper precautions.

The method is relatively easy, equipment and meters are less costly and data are accurate and reliable, said Professor Cai Zu Huang. Limitations of the method are the various kinds of interference introduced by non-seismological factors such as underground pumping of gas and water for industrial and agricultural purposes.

A monograph on seismological fluid geology written by Professor Cai and his wife will be published soon.

The conference explored a number of other paths which may lead to accurate earthquake prediction including the relation of earthquake factors to gravity, stress, magnetism and electricity as well as weather and animal behavior.

CSO: 4020

TTL DIGITAL INTEGRATED CIRCUIT PRODUCTS MANUFACTURED DOMESTICALLY

Beijing DIANZI KEXUE JISHU [SCIENCE AND TECHNOLOGY OF ELECTRONICS] in Chinese
No 11, 1980 pp 42-45

[Article by Zhao Baojing [6392 0202 4842] and Lu Minfeng [6424 3046 1496]: "Introduction to the Series of TTL Digital Integrated Circuit Products Manufactured Domestically"]

[Text] (VII) Medium Scale Asynchronous Counter

During the past 3 years, the TTL medium scale counter circuits manufactured domestically have found wider and wider applications. To adapt to the different needs of application, the domestically produced TTL medium scale counter can be divided into two types based on the structure of the circuits--asynchronous counter and synchronous counter. Both are four-digit counters.

The so-called asynchronous counter (or asynchronous counter, traveling wave counter, also called pulse driven counter) means the various triggers that compose the counter are not controlled by one common clock (or counting pulse), but count from the lower digit to a higher level (digit) step by step (in a synchronous counter, the various triggers are uniformly controlled by one common clock pulse). The characteristic of the asynchronous counter is that the structure of the circuit is simple, and when the number of digits to be counted is the same, the scale of integration is lower than the synchronous counter. But because of the accumulation of delays in the triggers of all levels (digits), the counting speed is lower.

There are four types of asynchronous counters (TTL) manufactured domestically that are being mass produced currently. Their model numbers are T210, T211, T212 and T213. The T210 and T211 are 2-5-10 system counters; the T212 is a 2-8-16 system counter, while the T213 is a variable counter. They are separately described as follows:

I. The T210--2-5-10 Counter

1. Logic Diagram

Figure 1 is the block diagram of the logic of the T210. Because it is a four-digit counter, it must include four triggers. The T210 consists of four simplified master-slave type J-K triggers and two added NAND gates. It is a relatively simple quinary and decimal general purpose counting circuit. The circuit can be directly cleared and it also has a set "9" function, but other data cannot be preset.

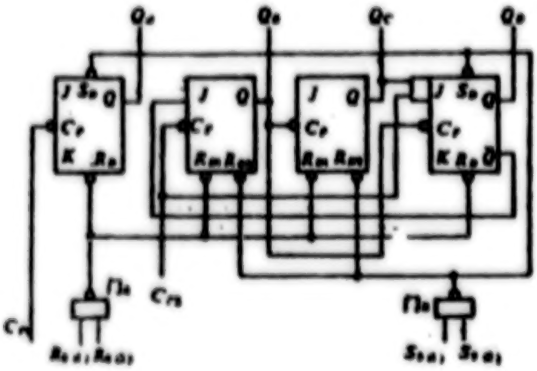

Figure 1. T210 Logic Diagram

2. Characteristics of Its Function and Application

It can be seen from Figure 1 that the entire circuit forms two independent counting units--the trigger A counting unit and the counting unit composed of triggers B, C, D (clear R_D is common). Obviously, when the counting pulse is added to D_{p1}, trigger A can independently serve as the 2 digit split frequency counting circuit. If the counting pulse enters the D_{p2} terminal, triggers B, C, D then serve as the 5 digit split frequency counting circuit.

When we want to use the T210 as a decimal counter, we only need to connect the output Q_A of trigger A to the C_{p2} terminal. At this time, the counting pulse enters C_{p1} and is output via Q_A (2-digit frequency split), then Q_B, Q_C and Q_D perform the 5-digit frequency split. Table 1 lists the truth value table (standard 8, 4, 2, 1 digital decimal counter). If we want to obtain another kind of 5, 4, 2, 1 numerical decimal count, then we can add a counting pulse to the C_{p2} terminal and let Q_B, Q_C and Q_D first perform a 5-digit frequency split, then via the connection between Q_D and C_{p1}, we let trigger A carry out the 2-digit frequency split, thus obtaining the 5, 4, 2, 1 numerical decimal count shown in Table 2. At this time, the output at the Q_A terminal is a symmetric square wave pulse of spatial ratio 1:1. This kind of symmetric 10-digit split frequency output wave form is often needed in the frequency synthesizer or on other occasions when the use of powers of 10 is needed.

This circuit has a direct clear function. When $R_{o(1)}$ and $R_{o(2)}$ are both input as "1" in electrical balance, all output terminals (Q_A, Q_B, Q_C and Q_D) are in the "0" state. But when in use, the characteristics of this circuit must be given attention--set "9" has priority over clear (reset to zero). When $R_{9(1)}$ and $R_{9(2)}$ input terminals that are additive all show an input electrical balance of "1", the output of gate_s must be "0", therefore at this time, regardless of the input state of $R_{0(1)}$ and $R_{0(2)}$, the output of triggers A, B, C and D will be forced into a set "9" state. Therefore, during the clearing (reset to zero) operation, at least one of $S_{9(1)}$ and $S_{9(2)}$ has a "0" electrical balance. If setting and clearing operations are simultaneously carried out, the final output state of the circuit will be determined by the final pulse of the setting or clearing pulses to be eliminated. If the two are eliminated simultaneously, then the output state of this circuit will show an indeterminant state. This point should be given extra attention by the user. Table 3 is the function table of the T210.

Table 1. Truth Value Table*

(1)	(2)			
	Q_D	Q_C	Q_B	Q_A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

Table 2. Truth Value Table**

(1)	(2)			
	Q_A	Q_D	Q_C	Q_B
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	1	0	0	0
6	1	0	0	1
7	1	0	1	0
8	1	0	1	1
9	1	1	0	0

* peripheral: Connect Q_A and C_{p1}
** peripheral: Connect Q_D and C_{p1}

Key:
1. Count
2. Output

Table 3. T210 Function Table

(1)				(2)			
$R_{0(1)}$	$R_{0(2)}$	$S_{9(1)}$	$S_{9(2)}$	Q_A	Q_B	Q_C	Q_D
1	1	0	Φ	0	0	0	0
1	1	Φ	0	0	0	0	0
Φ	Φ	1	1	1	0	0	1
Φ	0	Φ	0	(3)			
0	Φ	0	Φ	(3)			
0	Φ	Φ	0	(3)			
Φ	0	0	Φ	(3)			

Key:
1. Input
2. Output
3. Count

The function of the set "9" function of the T210 serves two purposes, one is when the circuit is used for decimal counting, the number "9" being set can be used as the base-minus-one compliment of the decimal system. The other purpose is that when the T210 circuit is being used in a cascade connection, a "competitive state" in clearing occurs. As shown in Figure 2, when two T210 circuits are used in a cascade connection, the output Q_{SA} of the last digit of the counter A and the C_{PB} terminal of counter B are connected. If A_{3A} originally had a "1" electrical balance, then when the clearing pulse is input from the R_D terminal, the output electrical balance of Q_{3A} will jump from "1" to "0". This is the same as inputting a counting pulse at the C_{PB} end of the counter B. If the clearing pulse input at the R_D terminal is narrow enough to be comparable to the delay time needed for the trigger to be cleared and switched, the state of counter B will switch once (switching error). Obviously, this is not allowed. But when we preset the two counters at "9" (at this time because of the output of the first and last digit of the trigger. a positive jump can occur only or the state will remain unchanged at "1", thus the change in the output state of Q_{3A} will not cause a switching error in counter B), then a clearing pulse is input at the C_{PA} terminal, and all output from counters A and B will show a "0" state.

The function and logic block diagram of the domestically manufactured T210 is entirely the same as those of the commercially mass produced SN7490A produced internationally. The major parameters are also similar (the highest operating frequency of the T210 is about 20MHz, lower than that of the SN7490A). In principle, the two can be used as a mutual substitute. But the arrangement of the lead wire outside the sealed container of the two is different. The power source V_{CC} of the SN7490A and the ground wire are separately placed on the two sides of the casing of the tube. The arrangement on the T210 follows the order of the outside lead wire of the TTL circuit commonly arranged in our nation. The V_{CC} and the ground wire are separately placed at the two diagonally opposite corners of the casing of the tube (see Figure 3), and special attention should be given to this arrangement when substituting one for the other.

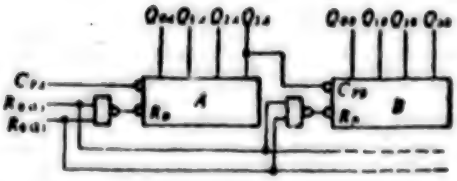

Figure 2. Cascade Connection (T210)

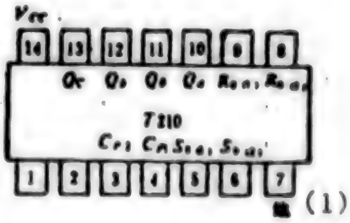

Figure 3. Extermінal Wiring Diagram of the T210

Key: 1. Ground

II. T211--2-5-10 Presetable Counter

1. Logic Diagram

Figure 4 shows the logic diagram of the T211. Its main difference from that of the T210 is the T211 has a preset (sending data) function. Therefore, besides the addition of several data sending guide and control gates, the structure and the function are the same as the T210, the truth value table is also completely the same (see Table 1).

2. Characteristics of Its Function and Application

The data sending function of the T211 is realized by the guiding gates. As Figure 4 shows, A, B, C and D are the input terminals for sending data by each trigger. C_T/L_D is the counting and data sending control terminal. When C_T/L_D = "0" and Cr = "1", the additional data are added to the R_D and S_D terminals of each trigger in a complimentary state via gate 1 (or gate 3, gate 5, gate 7) and gate 2 (or gate 4, gate 6, gate 8). When C_T/L_D = "1" and Cr = "0", each guiding gate (gate 1, gate 2, ...gate 8) is blocked, and data cannot be sent into the counter. At this time, the T211, like the T210, executes its counting function. Table 4 is the function table for clearing, sending of data and counting. The clearing operation of this circuit is direct. It can be seen from Figure 4 that regardless of the state of the C_T/L_D, the input data and the clock, as long as Cr = "0", all trigger' R_D = "0" (S_D = "1"), therefore direct clearing is realized.

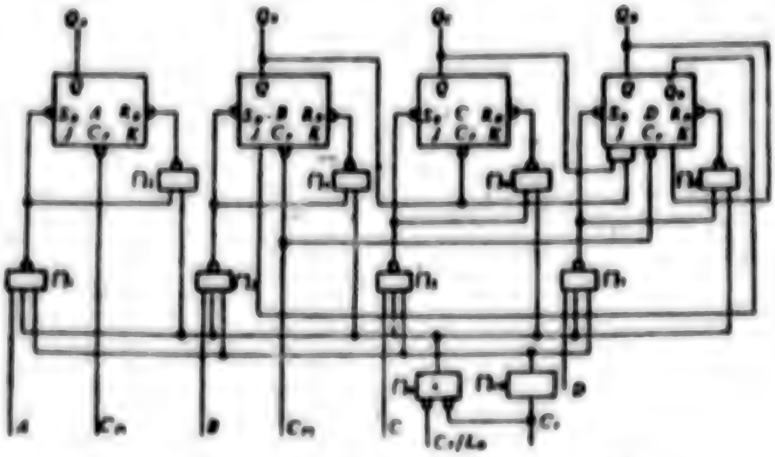

Figure 4. Logic Diagram of the T211

Table 4. Function Table of the T211

[illegible] (1) 入						[illegible] (2) [illegible]			
C_T/L_D	Cr	A	B	C	D	Q_A	Q_B	Q_C	Q_D
Φ	0	Φ	Φ	Φ	Φ	0	0	0	0
0	1	A	B	C	D	A	B	C	D
1	1	Φ	Φ	Φ	Φ	(3) [illegible] [illegible]			

Key: 1. Input; 2. Output; 3. Count

The function and logic diagram of the T211 is exactly the same as those of the similar commercial product SN74196 produced internationally, the basic parameters are also similar, and both are medium speed counting circuits. (The highest counting frequency of the T211 does not surpass 50mA, slightly less than that of the SN74196). The arrangement of the external wires of the T211 and the SN74196 is completely the same (see Figure 5). Therefore the two can conveniently replace each other.

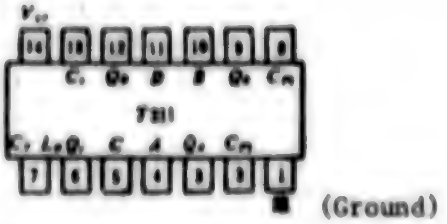

Figure 5. External Wiring Diagram of the T211

III. The T212--2-8-16 Presetable Counter

1. Logic Diagram

The T212 differs from the T211 in that the former is a simple binary counter. Thus it can be imagined that we need only to eliminate the connecting feedback wire of the triggers B and D in the logic block diagram of the T211 shown in Figure 4 and we obtain the logic diagram of the T212 (Figure 6).

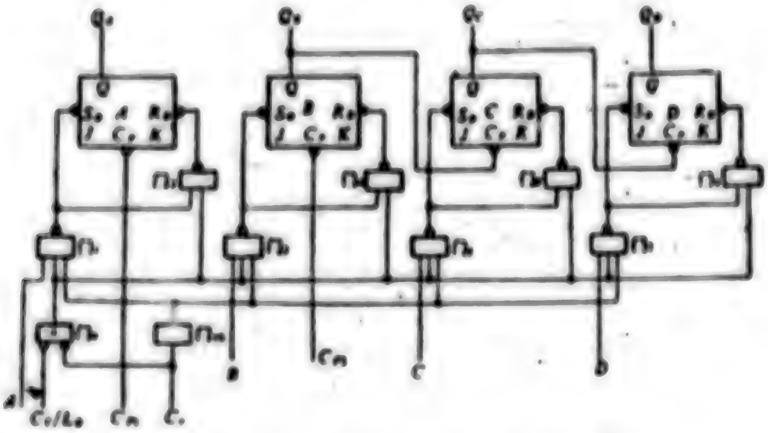

Figure 6. Logic Diagram of the T212

2. Function Characteristics

As shown in Figure 6, the trigger constitutes the 2-digit frequency splitter, the triggers B, C, D form the octal counter. When we connect Q_A and C_{p2}, and input a counting pulse at C_{p1}, the counter will count from the first digit to the fourth digit one by one at this time, and the typical 8-4-2-1 digital sexadecimal counter shown in Table 5 is obtained. If we wish to obtain an octal counter, then the counting pulse can be directly input via the C_{p2} terminal (Q_A and C_{p2} are not connected). The clearing and data sending functions of this counter is completely the same as those of T211. Table 6 is the function table of the T212.

Table 5. Truth Value Table of the 8-4-2-1 Digital Counter (T212)

(1)		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(2)	Q_A	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
	Q_B	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
	Q_C	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
	Q_D	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Key: 1. Count
2. Output

Table 6. Function Table of Preset to Reset to 0 and Counting Function Table (T212)

(1)						(2)			
$\frac{C_T}{L_D}$	C_r	A	B	C	D	Q_A	Q_B	Q_C	Q_D
φ	0	φ	φ	φ	φ	0	0	0	0
0	1	A	B	C	D	A	B	C	D
1	1	φ	φ	φ	φ	(3)			

Key: 1. Input
2. Output
3. Count

The T212 is a four-digit medium speed counter. Its function, logic diagram and the arrangement of the external wiring are completely the same as those of the similar commercial product SN74177 produced internationally. The highest counting frequency of the T212 is slightly lower than that of the SN74177, the highest counting frequency of the T212 generally can reach above 20MHz, and the other major parameters are all similar. Therefore the two can mutually replace each other. Figure 7 shows the arrangement of the external wiring of the T212.

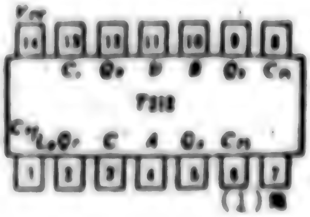

Figure 7. External Wiring Diagram of the T212

Key: 1. Ground

IV. T213--2-N-16 Variable Counter

1. Logic Diagram

The T213 is a medium speed four-digit counter that can conveniently realize any numbering system below sexadecimal. Its structure is simple. Its logic diagram is shown in Figure 8. It consists of four J-K triggers, three reverse gates and one AND-OR-NOT gate.

2. Characteristics of Its Functions and Applications

When the counter executes a holding function, it is only necessary to reset the electrical balance of the C_T terminal. At this time, the J and K terminals of the first digit of the counter (trigger A) is set via gate 1, thus the J-K trigger cannot be switched (when a counting pulse is input at the C_p terminal).

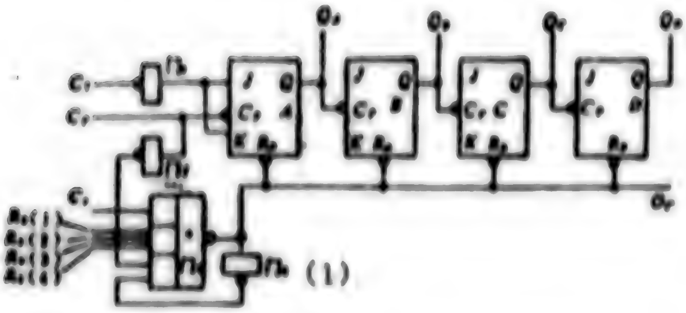

Figure 8. Logic Diagram of the T213

Key: 1. Door

The different number systems of the T213 is realized with the help of the feedback connections among the input terminals $R_{0(1)}$ to $R_{0(4)}$ of the AND-OR-NOT gate (gate 3) and the various terminals Q_A to Q_D. Table 7 shows the method of connection corresponding to different number systems (number of frequency splits). For example, let us take the decimal system which everybody is familiar with as an example. According to Table 8, we should connect Q_B and Q_D with $R_{0(2)}$ and $R_{0(1)}$, then according to the truth value table of the decimal system (10 frequency splits) shown in Table 8, when the 10 counting pulses arrive, the output of the counters Q_D, Q_C, Q_B and Q_A should be in the "1010" state, and via feedback connections, the input of $R_{0(1)}$ and $R_{0(2)}$ is all "1", forcing gate 3 to output "0", thus Q_A, Q_B, Q_C and Q_D are all cleared, realizing the decimal number. The principles of the other number systems are the same and can be similarly derived.

Table 7. Table of Connections of the 0-16 Split Frequency $R_{0(1)}$-$R_{0(4)}$ and Q_A-Q_D

(1)	(2)										
	[illegible].4.8.16	3	5	6	7	9	10	11	12	13	14	15
Q_D						R[illegible]	R[illegible]	R[illegible]	R[illegible]	R[illegible]	R[illegible]	R[illegible]
Q_C			R[illegible]	R[illegible]	R[illegible]				R[illegible]	R[illegible]	R[illegible]	R[illegible]
Q_B		R[illegible]		R[illegible]	R[illegible]		R[illegible]	R[illegible]			R[illegible]	R[illegible]
Q_A		R[illegible]	R[illegible]		R[illegible]	R[illegible]		R[illegible]		R[illegible]		R[illegible]

Key:

1. Output
2. Number of frequency split

Here, we must notice that gate 4 and gate 3 actually form a temporary storage. Their function is that when the counting pulse (C_p) is operating on an effective negative half cycle, even if for some reason the input state "1" of R_0 disappears, at this moment, the output of gate 2 and gate 4 is all "1", therefore the temporary storage is locked in, assuring the output state "0" of gate 3 is not changed, thus the counter can be reset to zero.

Table 8. Truth Value Table of Decimal Numbers

(1)	(2)			
	Q_D	Q_C	Q_B	Q_A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

Key: 1. Count
2. Output

This counter can be directly cleared. Regardless of the states of each part of the circuit, when Cr = "1", the output of gate 3 will show the "0" state, forcing the counter to clear.

This counter does not have a correspondingly similar commercial product. Because the final carry must pass through the first digit AND-OR-NOT gate and must include the delay time of the trigger $R_D \to Q$, therefore the counting speed of the T213 is slower. The highest counting frequency generally will not surpass 6MHz (actually measured at 5MHz). The electrical consumption of the T213 is less than 50mA.

Figure 9 shows the arrangement of external wiring of the T213.

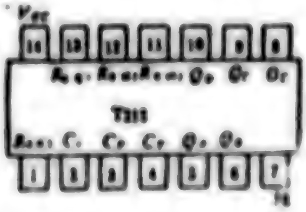

Figure 9. External Wiring Diagram of the T213

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APPLIED SCIENCES

BEIJING COMPUTER PLANT NO 1 BUILDS HYBRID-ANALOG COMPUTER

Beijing GUANGMING RIBAO in Chinese 8 Nov 80 p 2

[Article by Xu Zhixue [1776 1807 1331]: "Beijing Computer Plant No 1 Succeeds in Building Hybrid-Analog Computer"]

[Text] Beijing Computer Plant No 1 has successfully built the model DJM 330 hybrid-analog computer. This third generation machine can be linked to DJS 100 serial computers through a 16 channel model JK 01 interface. It is equipped with hybrid language and debug program software and becomes China's first general digital-analog hybrid computer system.

This computer consists of TTL medium and small scale digital integrated circuits and linear integrated circuits. It is capable of solving 24th order linear and nonlinear differential equations with constant and variable coefficients and performing real time and super real time computations for the physical systems described by these equations.

The National Computer Industry Bureau has recently evaluated the DJM 330 hybrid computer and the JK 01 interface; they are found to meet design requirements and are approaching international standards of major specifications on similar machines. Tests have shown that this computer system functions well and exceeds technical standards in major specifications. It has laid a sound base for batch processing.

The analog computer and digital computer are the two main categories in modern computer development. Analog computers are based on operational amplifiers. They have high computing speed and possess the feature that the physical quantities they transfer continuously vary. Because analog computers are most suited for solving linear and nonlinear differential equations and faithfully describe the motion process of a physical system, they are first used as efficient computing and design-assistance devices in the research and engineering design of aerospace, guided missile and automatic control sciences. They are indispensible in the process of system analysis, compilation and evaluation where analog computers serve as a simulation testing facility and computing and operation training facilities in actual control systems.

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PRODUCTION, APPLICATION OF SMALL MULTIFUNCTIONAL COMPUTERS EXPANDING

Shanghai KEXUE HUABAO [SCIENCE PICTORIAL] in Chinese No 10, Oct 80 pp 46-47

[Article by Zhu Xingeng [2612 9515 5087]: "The Small Multifunctional Computer"]

[Text] In the course of realizing the four modernizations, our nation's various departments of production technology, scientific research and educational departments are using digital computers to implement data processing, automatic control of industry and massive scientific computations on a wider and wider scale, thus stimulating the development of the computer industry. The production and application of small multifunctional computers have developed more rapidly. This is because although large and medium-sized computers are superior to small computers in function and precision, the structure of large and medium-sized computers is complex, they are expensive, and at present in our nation, they can only be installed in and used by a few departments. If large and medium-sized computers are used in ordinary engineering work or in the production of medium and small-sized enterprises then it would be a waste of talent; this is wastefulness. The small multifunctional computer is versatile, small in size, its structure is simple, it is easy to operate, inexpensive, and it provides the condition for popularizing the use of computers.

The DJS-131 digital computer has a word length of 16 bits, the computational speed is 500,000 times/second. It is a small multifunctional digital electronic computer. The functions of its commands are strong, it is complete, its source of software is rich. Its technological structure is superior and its stability is good. Its mean time between failures (MTBF) is 1,000 hours. At present, it already is equipped with a real-time operating system with protected page distribution (MTROS), or multiple equipment and multiple data channel systems operations controlled by a magnetic disc operating system (RDOS). It can also be connected to a multiple channel communicator (at most 64 terminals). It can use an exchangeable, multiple user and expandable BASIC under the support of RDOS so that the tasks of each user can be performed within the scope of the internal memory entirely. The appropriate combination of hardware and software makes it possible to build real time systems, times-sharing systems, dual machine systems and on-line system with the TQ-16, suitable for application in all fields.

The Shanghai Electronic Computer Plant (originally the Shanghai Radio Plant No 13) is one of our nation's earliest plants that specialized in the production of electronic computers. For over 10 years, it has accumulated rich experience in test manufacturing and production of computers. The units of large, medium and small computers produced by that plant lead the nation. Over 220 of the small DJS-131 multifunctional digital computers have already been produced, constituting two-fifths of the total production of the 100 series machines in the nation. It is being widely used in power generation, postal and telecommunications services, education, chemical engineering, railway, seismology, meteorology, medicine, coal mining, scientific research and national defense construction. In the quality evaluation competition of the DJS-130 computers produced throughout the nation sponsored by the National General Administrative Bureau of the Electronic Computer Industry of the Fourth Ministry of Machine Building held in 1980, the DJS-131 digital computer manufactured by the Shanghai Electronic Computer Plant won the highest score.

The more complete the peripheral equipment that can be connected to the computer, the richer the source of software, and the more capable the computer is. The more the computer can live up to its capabilities, the broader the range of its application will be. The peripheral equipment of the DJS-131 digital computer produced by the Shanghai Electronic Computer Plant is complete and has a rich source of software. Peripheral equipment includes: B55 model teletypewriter, G-2 model photoelectric device, CK-160 model puncher, CYD-801 model wide line printer, numerically controlled plotter, TQGK-2 model floating drum controller, TQDK-1 magnetic tape controller (one control unit can be connected to eight magnetic tape units), TQPK-1 magnetic disc controller (each unit has a capacity of 50M bits on discs), TQDL-2 asynchronous multiplex communicator (a maximum of 64 channels, transmission distance is 15 kilometers), TQZB-1 tabulator control unit, TQD-1 channel and character display, eight-unit printout control and photoelectric pen display totaling 16 kinds of peripheral equipment. The interface is standard, interfacing is versatile, the function is strong, and reliability is good. Therefore the machine won first prize in its ability to form a system in the quality evaluation competition of the DJS-130 computers throughout the nation in 1980.

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SHANGHAI ELECTRONIC COMPUTER PLANT COMPUTERS ADVERTISED

Shanghai KEXUE HUABAO [SCIENCE PICTORIAL] in Chinese No 10, Oct 80 back cover

[Advertisement]

[Text] Shanghai Electronic Computer Plant
(formerly the Shanghai Radio Plant No 13)

Quality First. We Do the Three Contracts. We Assist in Installation. We Build Systems. We Also Sell Accessories. We Accept Direct Orders. We Deliver on Time.

DJS-131 Small Sized Multifunctional Electronic Computer

Speed: 500,000 times/second Word length: 16 bits
Capacity: 4 - 32 K, 64 channels

Hardware: Additional multiplication and division components, real-time clock, component to protect distribution of pages of internal memory, automatic guidance components

Rich Software Resources: RTOS, MRTOS, RDOS operating systems. Coupled with compiler, BASIC, FORTRAN-4, ALGOL language programs

Peripheral Equipment: Magnetic disc, magnetic drum, process channel, photoelectric pen display, character display, X-Y recorder, tabulator, wide line printer, 8-bit printout control, multichannel communicator, multiple machine communications equipment and such systems hardware

It uses two-directional bus with a strong interfacing function. It uses double row directly inserted hermetic components. The machine and components are tightly sealed.

It is suitable for real time data processing, industrial control, scientific computations.

DJS-220 Computer

Speed: 100,000 to 150,000 times/second, Word length: 32 bits.
Commands: 187 commands
Capacity: 64 to 128 K

It possesses Hamming code inspection. It uses microprogram design techniques. It has multiple channels, high efficiency. The capacity of information flow is large. The equipment is versatile for interfacing.

It possesses microdiagnosis and inspection, maintenance efficiency is high.

It is suitable for scientific computations, data processing, real time control.

TQ-16 Medium Sized General Purpose Computer

Speed: 120,000 times/second. Word length: 48 bits floating point computation
Capacity of internal memory: 32K, expandable to 64K

It is equipped with magnetic disc and can be used in conjunction with the DJS-131 machine.

It is equipped with ALGOL suitable for scientific computations.

TQ-6 Large Sized Digital Computer

Speed: 1,000,000 times/second
Word length: 48 bits, floating point computation
Capacity of internal memory: 130K

It is equipped with magnetic disc. It possesses time-sharing functions. The functions of its commands are strong, suitable for scientific computation.

Our plant also test manufactures 180 series computers, single chip microprocessor systems and the TQ-12_{H2} model desk-top computer.

Address of plant: No 1486, Nanjing West Road, Shanghai City
Telephone: 564585
Telegraph: 2058
Postal Serial Number: 200040

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APPLIED SCIENCES

CHINA BUILDS FIRST AUTOMATIC-FOCUSING PROJECTION PHOTOETCHING MACHINE

Beijing BEIJING RIBAO in Chinese 2 Dec 80 p 1

[Article by Liu Jingzhao [0491 0079 6856]: "China's First Automatic-Focusing Projection Photoetching Machine Successfully Built"]

[Text] To advance the large scale and very large scale integrated circuit technology, a 2-year joint effort was made by Qinghua University, Hebei Semiconductor Institute and Shanghai Semiconductor Devices Institute and the first Chinese automatic-focusing projection photoetching machine, model ZGK-50 of the direct staged multiple exposure type, has now been successfully built. In the evaluation session concluded yesterday, all the specifications of this machine were found to meet design requirements and some performances actually exceeded the design standard. Notably the accuracy of automatic focusing, the lends resolution and the uniformity of illumination have either reached or are approaching international standards of similar machines.

Fabrication technology of large scale and very large scale integrated circuits is at the forefront of the electronics industry and photoetching is a key technology in the manufacture of integrated circuits. China currently uses contact type photoetching machines in which the manual focusing and direct contact between mask and silicon wafer often led to mask damages and low acceptance rate of products. Industrialized nations in the world have recently adopted the new techniques of projection photoetching and automatic focusing to increase the product acceptance rate.

In early 1978, the National Science and Technology Commission gave high priority to this research and formed a research group consisting of workers from Qinghua University, Hebei Semiconductor Institute and Shanghai Semiconductor Devices Institute. Members of this research group are all college graduates educated since the revolution. They have done intensive search and collection of information which amounted to several hundred thousand words. The scientists often repeated tens or even hundreds of tests to assure the accuracy of one datum. With the assistance from Beijing Semiconductor Devices Institute and Beijing Municipal Electricity and Light Source Institute, the photoetching machine was finally developed and built.

This machine employs automatic-focusing projection to avoid contamination and wear of masks and thereby improves the product acceptance rate. Because the machine uses staged multiple exposure in one focusing operation, the focusing time is reduced and production efficiency is improved. The machine is also equipped with an industrial television display system which allows observation and monitoring of the automatic focusing procedure. It also has applications in other areas such as direct precision-reduction of chromotype and colortype and matching of complex patterns.

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APPLIED SCIENCES

OPERATION OF LASER TURBOFAN ENGINE OUTLINED

Beijing GUOJI HANGKONG [INTERNATIONAL AVIATION] in Chinese No 12, Dec 80 p 27

[Article by Qu Lisheng [4234 4539 3932]: "A Laser Turbofan Engine"]

[Text] A laser turbofan engine is an engine which relies on external laser power as the main energy source. The difference between a laser turbofan engine and a conventional turbofan engine is that it is equipped with both a combustion chamber in which fuel is burned, and a heat exchanger which absorbs external laser energy. During airplane take-off and landing, the laser propulsion system is not activated; thrust is generated solely from the combustion of fuel-air mixture in the combustion chamber, as in the case of a conventional turbofan engine. When the airplane climbs to an altitude of 9 km, the laser propulsion system begins to function. The air stream from the compressor no longer enters the combustion chamber; instead, it passes through the heat exchanger where laser energy is converted into thermal energy in the air. The high temperature, high pressure air stream propels the turbine, and then is expanded through the nozzle to generate thrust.

On top of the laser turbofan engine is a 15 m laser receiver, which focuses the external laser beam and directs it into the heat exchanger. The heat exchanger is located inside a black-body chamber with a 5 m window. The chamber also has a reflection system and a light tube which can store laser energy in the heat exchanger.

In order to reduce the pressure in the heat exchanger, the Mach number of the air stream entering the heat exchanger must be maintained at 0.05. During the combustion stage, the turbine temperature is 1560 K at sea level, and 1420 K at high altitude; when the laser propulsion system is activated, the temperature drops down to 1100 K. By increasing the size of the heat exchanger, it is possible to increase the turbine temperature and thrust; however, the weight of the heat exchanger is also increased, thereby canceling the effect of higher thrust.

The operation of the laser propulsion system also depends on a laser energy transport system, as shown in Figure 2. The transport system mainly consists of a laser power satellite and a relay satellite. The laser power satellite converts the collected solar radiation into laser energy, and transmits the laser energy via the transport system to the relay satellite. The relay satellite in turn transmits it to the laser turbofan engine onboard the airplane. The energy can be transmitted effectively and accurately in accordance with the flight attitude of the airplane.

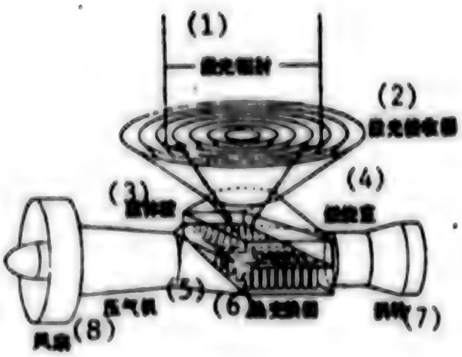

Figure 1. A Laser Turbofan Engine

Key:
(1) Laser radiation
(2) Laser receiver
(3) Black-body chamber
(4) Combustion chamber
(5) Compressor
(6) Heat exchanger
(7) Turbine
(8) Fan

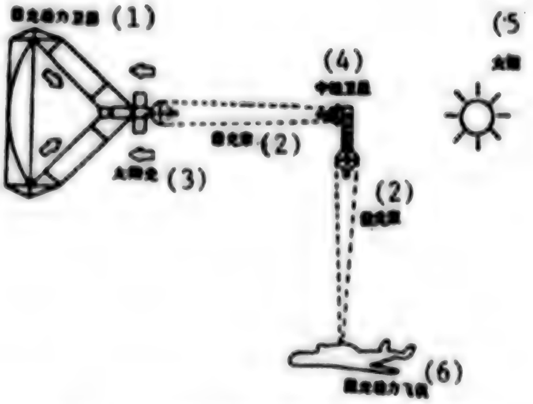

Figure 2. Laser Transport System

Key:
(1) Laser power satellite
(2) Laser beam
(3) Sun light
(4) Relay satellite
(5) Sun
(6) Laser propulsion airplane

It is reported that the laser turbofan engine used on an 18-ton, 5500-km range airplane carrying 196 passengers can save 25 tons of fuel per flight. Because of the potential of laser turbofan engine in conserving energy sources, many countries have devoted substantial amount of manpower and material resources to conduct research in this field.

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CSO: 4008

APPLIED SCIENCES

BRIEFS

SINKING CITIES--Shanghai, 10 Dec (Xinhua)--Specialists are calling for prompt action to halt the sinking of a number of Chinese cities, including Beijing. Key to this, they point out, is a rational utilization of underground water resources. More than 100 geologists and specialists at a recent national conference here presented the following facts: Tianjin subsided 1.78 meters between 1959 and 1979; Changzhou, a rising industrial city in Jiangsu Province, sank by 0.147 meters between 1978 and 1979; Beijing, Sian, Taiyuan, Wuxi and Ningbo cities and the Yangtze River delta are subsiding to varying degrees. They proposed that a national agency be set up to unify the exploration and use of underground and surface water resources, and that a statute on water resources be drawn up as part of the nation's laws. They also urged comprehensive scientific research into ways to control surface subsidence. Shanghai provides a good example, they said. Between 1921 and 1965, Shanghai had subsided 2.63 meters. The city adopted measures, including tapping less underground water, replenishing the water table by pumping back used water, and readjusting the tapping of reservoirs. No further subsidence has occurred since 1966. [Text] [OW100825 Beijing Xinhua in English 0816 GMT 10 Dec 80]

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BRIEFS

SHAANXI SCIENTIFIC RESEARCH MEETING--The Shaanxi Provincial Science and Economic Committees jointly held a meeting from 28 October to 2 November in Xian to exchange scientific research experience in factories, mines and enterprises. The meeting demanded that all factories, mines and enterprises strengthen scientific research work to speed up industrial production. Some 250 people attended the meeting. Zhang Ze, secretary of the Shaanxi Provincial CCP Committee, attended the meeting and delivered a speech. At the end of the meeting, He Chenghua, the vice provincial governor, made a summation speech. All participants at the meeting held: the launching of scientific research and technological renovation in factories, mines and enterprises is conducive to industrial modernization. We must bring our province's superiority into play and develop scientific research work. [Xcian Shaanxi Provincial Service in Mandarin 1100 GMT 4 Nov 80]

HUBEI RESEARCH-PRODUCTION COORDINATION--On 12-13 January, the Hubei Provincial Economic Commission and the Provincial Scientific and Technological Commission held the province's first meeting on technological cooperation between scientific research units and production units in the Wuhan area. For years there has been no link between scientific research and production, making it difficult for scientific research units to popularize their findings and for production units to solve technical problems. At the meeting, 58 scientific research and production units exchanged information and made joint efforts to solve each other's problems. [OW200359 Wuhan Hubei Provincial Service in Mandarin 1100 GMT 15 Jan 81]

GUANGXI MODERNIZATION LECTURE--Professor Qian Weichang, a noted scientist in China, gave a lecture on problems in the modernization drive in Nanning, Gangxi, on 15 January. Attending the lecture were some 2,000 leading cadres, scientists and technicians in Nanning, including chairman Qin Yingji and vice chairmen Luo Libin and He Yiran of the Guangxi Regional People's Government. In the lecture, Professor Qian cited China's human and natural resources and the CCP's tremendous organizing capability as favorable conditions for realizing the modernization program. He also stressed the rational use of talents. [OW200359 Nanning Guangxi Regional Service in Mandarin 1130 GMT 16 Jan 81]

SHANGHAI SCIENTIFIC REPORT MEETING--On the morning of 29 January, Yang Shifa, deputy secretary of the Shanghai Municipal Party Committee and vice mayor of Shanghai, made a report on the current situation before a gathering of some 2,000 cadres and personnel of the city's scientific and technical departments. Stressing the policy of economic readjustment and political stability mapped out by the central authorities, Yang Shifa told his audience that scientific and technical work must also be readjusted to conform to existing guiding principles. [Shanghai City Service in Mandarin 1130 GMT 29 Jan 81]

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SUBJECT INDEX TO 'NEIRANJI GONGCHENG' NO 4, 1980

Shanghai NEIRANJI GONGCHENG [CHINESE INTERNAL COMBUSTION ENGINE ENGINEERING] in Chinese Vol 1 No 4, 15 Dec 80 pp 43-44

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ORG: None

TITLE: "The Stress and Strength of the Hydraulically Autofretted Gun Barrel (Semi-Finished)"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 1-15

TEXT OF ENGLISH ABSTRACT: The object of this study is the open-end, hydraulically-autofretted, thick-walled cylinders (Ni-Cr steels). The simplest solution which considers strain-hardening of material is used to calculate the stress distribution of the cylinders and internal pressure-external strain relations during loading. The Bauschinger effect curve in the uniaxial tension-compression test of the material is approached by linear-hardening. The equivalent strain in the cylinder plastic region is replaced by the circumferential strain. Then the stress variation and internal pressure-external strain relation during unloading are solved and the residual stress is predicted from the algebraic sum of stress distribution during loading and unloading. These solutions are simple as the above-mentioned approximations are applied. The rationality of these approximations is verified by the test and theoretical analysis in this paper, and the real determinations of the internal pressure-external strain relation and the autofretted cylinder residual stress have proved that the accuracy these theoretical solutions possess is considerably satisfactory.

[Continuation of BINGGONG XUEBAO No 4, Dec 80 pp 1-15]

Based on the theoretical analysis of the residual stress, the strength design of the hydraulically-autofretted gun barrel and the design of the process parameters in autofrettage are preliminarily explored.

AUTHOR: WANG Xiangqing [3769 3276 0615]
FANG Zhichang [2455 0037 2490]
ZHANG Jianhua [4545 1696 5478]

ORG: None

TITLE: "Cycle Calculations and Performance Analysis of Gas Turbine for Tanks"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 16-27

TEXT OF ENGLISH ABSTRACT: This paper presents an analysis of the simple cycle and regenerative cycle of the split shaft gas turbine for tanks in detail and the exact computations of thermodynamic cycle by means of strict calculative methods of aerothermodynamics with various influences on real cycles considered. A set of curves relating to pressure ratio, turbine inlet temperature and regenerator effectiveness is obtained. Therefore, this paper is in favor of designers selecting optimal design and modifying the existing aero-gas turbines to be used on tanks.

In calculating, we adopt the variable specific heat which varies with the temperature and the composition of combustion gases. Therefore, a high accuracy in calculations is maintained.

[Continuation of BINGGONG XUEBAO No 4, Dec 80 pp 16-27]

Finally, we analyze the influence of environmental temperature, turbine inlet temperature, the efficiency of assemblies, drag-in flow and regenerator effectiveness on the specific output and thermal efficiency of the simple and regenerative cycles.

AUTHOR: LAI Baitan [6351 4102 1098]
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ORG: None

TITLE: "Method of Graphical Analysis--A Method to Verify and Design a Self-Destruction Device with Centrifugal Steel Balls"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 28-35

TEXT OF ENGLISH ABSTRACT: This paper presents a method for employing small and medium-sized electronic computers to compute and select the angular velocity ω_{t0} of a self-destruction device, and to determine the principal structural parameters of the device. In this method, first we compute the exterior trajectory and the rotational angular velocities of the projectiles along the trajectory, and then we obtain the curve ω-t of angular velocities vs time of flight. Through the analysis of ω-t curve family under various angles of fire, we select a $\omega_{t0}*$ which can meet the tactical requirements. For various numbers and diameters of the steel balls, we can compute the curve of angular velocity ω_{t0} of self-destruction vs oblique angle α of the bevel-shaped edge of the sleeve, and we get a group of curves. Based on the $\omega_{t0}*$ selected from the tactical requirements, we can determine suitable structural parameters i, d and α. With this method we can easily reveal the conditions of the dispersion of the burst points and the

[Continuation of BINGGONG XUEBAO No 4, Dec 80 pp 28-35]

relationship between the positions of burst points of self-destruction and the minimum angle of fire θ_{0min} under various angles of fire θ_0 so as to solve the problem of optimum design which needs a large number of calculations and requires few, but very comprehensive, influencing factors.

AUTHOR: TIAN Deyu [3944 1795 0151]

ORG: None

TITLE: "Graphical Method for Calculating the Performance of Smokeless Propellant"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 36-46

TEXT OF ENGLISH ABSTRACT: In this paper a series of isoperformance trigonal diagrams of NC-NG(TA, TEGN)-RDX(HMX) smokeless propellants systems is drawn. From the diagrams the relationship between the formulation and the performance and gas composition of the propellant is clearly shown. If the composition of the propellant is given, the values of the performance and the gas composition can be easily determined. Also from the drawing, the composition of the propellant can be readily determined in accordance with the performance value given. It is possible to choose an optimum formulation according to the technology required. This method is characterized by simplicity, visualization and convenience in the design and choice of formulation.

In addition, the effects of nitrogen content of NC, type of plasticizer used and variation of pressure on the performance of propellant are calculated and discussed. It is suggested that the proper increase of pressure can be advantageous to the full utilization of propellant energy.

[Continuation of BINGGONG XUEBAO No 4, Dec 80 pp 36-46]

Finally it is demonstrated that the increase of nitrogen content in propellant formulation is an important approach to raising the energy release rate at low pressure.

AUTHOR: WEI Huizhi [7614 1920 0037]
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ORG: None

TITLE: "Elastoplastic Analysis of Projectile Under Firing Conditions with Finite Element Method"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 47-53

TEXT OF ENGLISH ABSTRACT: The strength analysis (especially elastoplastic analysis) of a projectile on firing is one of the problems to be solved in projectile design. In this paper this is discussed with the finite element method. A computer model for HEAT projectile is discussed and the calculations are made with an axisymmetric elastoplastic program. The results obtained are analyzed and compared with the data of live firing.

AUTHOR: JIANG Fan [5592 0416]

ORG: None

TITLE: "The Test and Analysis of Thermal Shock of Rocket Nozzle Materials"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 54-61

TEXT OF ENGLISH ABSTRACT: This paper introduces the evaluation of thermal shock resistance of seven high temperature materials (pyrolytic graphite, siliconized graphite, tungsten-deposited graphite, molybdenum, silicided molybdenum, ceramic Si_3N_4-SiC and cermat TiC-Mo-Ni), using the following methods: (1) furnace heating, (2) oxyacetylene flame heating, (3) plasma flame heating, (4) rocket engine test. Test results show that the oxyacetylene flame method is nearly as good as the rocket engine test. Thus the oxyacetylene flame test may be regarded as a simple and effective method for selecting rocket nozzle materials. Technical specifications of such test and classification standards are proposed. In addition, factors influencing the thermal shock resistance of materials and main technical approaches for improving nozzle materials are discussed.

AUTHOR: ZHANG Zhengqi [1728 2398 1142]

ORG: None

TITLE: "The Experiment and Analysis of the Lethal Effect of Projectile Fragments"

SOURCE: Beijing BINGGONG XUEBAO [ACTA ARMAMENTARII] in Chinese No 4, Dec 80 pp 62-67

TEXT OF ENGLISH ABSTRACT: In this paper, through a certain method the energy of fragments of different shapes and weights, which had killed dogs and penetrated a dry pine plate (25 mm thick), is measured and calculated. The relationships between the lethal effect and lethal energy and their influential factors are analyzed. It has been proved that it is reasonable to evaluate lethal (penetrating) energy with specific kinetic energy (i.e., the kinetic energy per unit area) and to set the energy which can penetrate a dog's thorax as a standard of killing animals. In addition, the consistent relations between these two sets of targets are discussed.

This will be of significance in improving the design of ammunition power and of practical use for troops.

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CSO: 4009

AUTHOR: DAI Hewu [2071 0735 2976]

ORG: Deputy Director, Beijing Institute of Coal Chemistry, Academy of Coal Sciences

TITLE: "Coal Liquefaction and Utilization of Coal Resources"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 2-6

TEXT OF ENGLISH ABSTRACT: In this paper the development of a coal liquefaction technique, liquefaction methods, mechanism and requirement of raw material selection are introduced. Analysis of coal resources in China suitable for liquefaction is given. In addition, the importance of coal liquefaction research in the area of coal resources utilization is described.

AUTHOR: LIU Yuanshu [0491 0337 2579]

ORG: Shanghai Institute, Academy of Coal Sciences

TITLE: "Analysis of Coal Cutting with Shearer Bits and the Status of Their Application"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 7-13

TEXT OF ENGLISH ABSTRACT: Analysis is given on coal cutting with radial bit, round bit and tangential bull bit. Optimum selection of geometrical parameters for bits and also suitable conditions for the application of various types of bits are demonstrated.

An investigation is also made in this paper on the application of four types of bits often used in Chinese coal mines. They are the round bit, the wide radial bit with flat front blade, the wide radial bit with cylindrical tungsten carbide flat front blade and the ridged roof type radial bit. Finally, existing problems are analyzed and measures of solutions are described.

AUTHOR: LI Youliang [2621 2589 0081]
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ORG: None

TITLE: "The Coal Forming Conditions for Coal Seams and Coal Measures of the Heshan Group, Upper Permian Series in Guangxi Province (Part 2)"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 14-15

TEXT OF ENGLISH ABSTRACT: This paper discusses the coal forming conditions for the coal seams and coal measures of the Heshan Group, based on the analysis of the historical background and paleo-geographical environment of the Permian Series in Guangxi Province. It holds that the development of the coal basin was controlled by an epsilon-type structure and a latitudinal structure. It is observed that the roof, floor and partings of the coal seam are composed of algal micritic limestone and algal skeletal micritic limestone. Therefore the authors affirm that the central part of Guangxi Province in the Late Permian Period was a typical epicontinental sea. The compensative deposits of algae on the carbonate platform in very shallow water created the conditions for the occurrence of the peat swamp and established the supratidal swampy facies. The environment for the accumulation of the major coal seams is analyzed. The peat swamp which was covered by stable deep water and that which was periodically covered by water both favored the formation of thick coal seams.

AUTHOR: None

ORG: None

TITLE: "On the Application of Hydraulic Props in China"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 26-29

TEXT OF ENGLISH ABSTRACT: In this paper reasons of high cost in popularization of hydraulic props and their solution are given. Calculation of the high initial investment is made. The author points out that the application of hydraulic props is optimal from a long-term point of view, but the financial regulations must be revised. Each of the existing technological and administrative problems in the popularization is reviewed. The conclusion is that the current popularization is suitable for mine geological conditions and is also suitable for recent administrative and skill levels. The application of hydraulic props can lead to better technoeconomic results with a smaller investment.

AUTHOR: None

ORG: None

TITLE: "The Suitability of ZY-35 Type Chock Shield Support in Moderately Unstable Roof Conditions"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 35-40

TEXT OF ENGLISH ABSTRACT: An average production of 42,431 tons per month was gained in a coal face using the ZY-35 type chock shield support in an approximately 3 meter high seam inclining 9~14 degrees. Observation of the initial roof pressure, cyclic pressure and support resistance demonstrates that 400 tons of designed support resistance is in accordance with the demands.

Measurement and analysis of the rock pressure on the front canopy, canopy, shield canopy, base and the whole set of the support indicate that the acting point of the resultant force is between the front and rear legs meeting the design requirement. After describing tests of the sprag, side flap, pull-push load and set load, the author indicates that this type of support is suitable for use in moderately unstable roof conditions.

AUTHOR: SUN Haiyu [1327 3189 5940]

ORG: Shandong Mining College

TITLE: "The Optimum Coordination of Inverse-Time Overload Protection in 6-35 kV Network"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 11, Nov 80 pp 45-51

TEXT OF ENGLISH ABSTRACT: In this paper a more precise and simple new theory is described and the optimal increment of time-limit ΔT is determined according to the value of coordinated points N, pointing out problems in time-limit coordination of inverse-time overload protection in a 6-35 kV network. An introduction to methods of lowering the level of the time-limit in the network changing the features of overload protection is also given.

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CSO: 4009

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TITLE: "Views on Some Questions in Pursuance of a 'Six Hour Four Shift' Working System"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 12, Dec 80 pp 2-9

TEXT OF ENGLISH ABSTRACT: In its description of pursuance of the "Six Hour Four Shift" working system which has been implemented in the Lier Mine, Xieyi Mine, Huainan Area; Qishan Mine, Xuzhou Area; Linxi Mine, Kailuan Area and Fuli Mine, Hegang Area, advantages of this system have been affirmed. Problems in the cyclic operation, labor organization, wage and site management have been discussed. It is suggested that regular cyclic operation should suit the different conditions of the fully mechanized faces, ordinary mechanized faces and shot and fire faces. Corresponding measures and ideas for labor organization and for different links in production have also been proposed.

AUTHOR: GUAN Baoshu [7070 1405 2885]

ORG: Xinan Jiaotong University

TITLE: "Some Aspects of the Mechanism of Tunnel Lining"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 12, Dec 80 pp 16-19

TEXT OF ENGLISH ABSTRACT: Investigations have been made into the stable cavern structure, the failure of the cavern in four stages, the lining effect and the contact between the lining and the surrounding rock. It is pointed out that roof bolting and shotcreting provides a better type of support, although it is not the sole means of support. There are some conditions affecting its application.

AUTHOR: WU Minglong [0702 2494 7893]
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ORG: Both of the Shanghai Institute, Academy of Coal Sciences

TITLE: "An Analysis of the Quality of Idlers"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 12, Dec 80 pp 30-34

TEXT OF ENGLISH ABSTRACT: The performances of different structures of domestic and foreign made idlers, such as diameter run-out, axial clearance, rotary drag, axial pressure and seals, have been tested systematically in the laboratory. The major factors that affect the quality of the idlers are the type of structure of the idlers, the material of the components and the machining and assembly of the idlers. Finally, some suggestions are put forward for the improvement of the quality of type TD75 idlers made in China.

AUTHOR: KANG Shiwu [1660 1597 2976]

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TITLE: "Improvements in a 12-Channel Power Line Carrier Wave System Used in Coal Mines"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 12, Dec 80 pp 35-39

TEXT OF ENGLISH ABSTRACT: In light of the disadvantages of the original 12-channel carrier wave system which is widely used in China, some modifications have been made. This paper describes the circuits of the transmitter and the receiver of a piezo electric ceramic filter. Improvements in anti-vibration protection for the ceramic filter and signal stabilivolt circuit of the wave carrier were made for improving the performance of the wave carrier with variations of the reactance of the power supply network.

The circuit described in this paper still has the advantages of the original 12-channel wave carrier system, but is smaller.

AUTHOR: HAN Shiqi [7281 0013 3823]
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TITLE: "Tests of Pump Components Made with White Cast Alloy Iron"

SOURCE: Beijing MEITAN KEXUE JISHU [COAL SCIENCE AND TECHNOLOGY] in Chinese No 12, Dec 80 pp 40-42

TEXT OF ENGLISH ABSTRACT: Comparisons were made of cast alloy iron pump components made from four different materials, such as Cr15Mo3, W16, W25 and No 2 abrassive material. It has been proved that Cr15Mo3 is the best material. The life of the impeller made from Cr15Mo3 with a specific gravity of 1.52 reached 9361 hours. A formula for the composition and requirements of raw materials has been developed.

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AUTHOR: SUN Fuzhong [1327 1788 0022]

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TITLE: "Marine Oil Drilling Equipment"

SOURCE: Beijing JIANCHUAN ZHISHI [KNOWLEDGE OF SHIPS] in Chinese No 9, 20 Dec 80 pp 2-4

ABSTRACT: Offshore oil drilling installations may be types that rest on the bottom or floating types. In the former category are installations with a base that is filled with water and sinks to the bottom, and installations mounted on legs and equipped with machinery so that they can raise themselves above the water surface by moving up these legs. The floating types include ships of various design and semisubmersible rigs. The floating installations can be used farther from shore and are generally more stable in bad weather and high seas. Most offshore drilling still uses the rigid rod rotary drilling technique. But because there is water between the derrick and the wellhead, an additional complement of underwater equipment is needed, including a guide frame, automatic connectors, blowout preventers, constant-tension equipment and ball connectors to compensate for ship roll. Equipment for drilling exploratory wells 5,000 to 6,000 meters deep may weigh more than 3,000 tons and require a deck operating area of about 2,000 square meters; the power requirement may be about 5,000 kilowatts. A ship must have excellent positioning, even in a gale and in high seas. The roll must not

[Continuation of JIANCHUAN ZHISHI No 9, 1980 pp 2-4]

exceed 2°. A ship may be held in place by casting 6 to 10 heavy (10 ton) anchors from the bow and stern, or 6 to 8 anchors from a pivoted disk in the center of the keel. When the water is deeper than 300 meters anchors cannot be used, but a sonar transmitter can be placed on the sea floor and the signals from it interpreted by a computer on board the ship and converted into the proper operation of lateral propulsion devices in the ship's hull so as to maintain position. Many methods of preventing roll have been developed, including anti-roll tanks, active-passive systems and the like. The main approaches to preventing roll are: preventing the ship from rolling in resonance with the waves, increasing the damping, and decreasing wave action on the hull. Two important techniques are: double-hulled ships, and semisubmersible rigs.

AUTHOR: ZANG Xinmin [5258 2450 3046]

ORG: None

TITLE: "Is the Soviet Union Building a New Battleship?"

SOURCE: Beijing JIANCHUAN ZHISHI [KNOWLEDGE OF SHIPS] in Chinese No 9, 20 Dec 80 pp 34-35

ABSTRACT: The new Soviet cruiser Kirov, with a length of 247.5 meters, a maximum breadth of 27.5 meters, a draft of 10 meters and a displacement of 32,000 tons, is so large that it approaches the size of battleships of the past. Its construction was begun in 1975 and it was completed in 1977. It is 3 times as large as the Kara class cruisers and has a top speed of 32 knots. Its main weapons are antiship missiles: 8 SSN-12's in 4 twin racks, with storage room for 16 more and an automatic reload system. Target positioning is obtained from a Kosmos satellite and guidance is effected by shipboard radar and Yak-36 aircraft. The Kirov also has 4 SA-N-3 long-range SAM's and 4 SA-N-4 short-range SMA's. It probably a also carries the SUWN-1 antisubmarine missiles or the new SS-N-15 missiles. It can carry 4-6 Yak-36 VTOL aircraft or Ka-25 helicopters. In addition it has 3 kinds of guns. Construction of another ship in the class, also nuclear powered, was begun in 1978 and work on a third is beginning; the class is expected to number 12. Together with an expected 4-6 nuclear powered carriers these will give

[Continuation of JIANCHUAN ZHISHI No 9, 1980 pp 24-25]

the Soviet Union an important long range attack capability. Its mission is, in combination with the nuclear carriers, to combat the 12 U.S. carriers. It will also be important in the struggle to destroy enemy ballistic missile submarines. In combination with amphibious landing ships such as the Ivan Rogo [illegible] be able to execute amphibious landings, and with the Kiev class carriers it will be able to attack enemy submarines. It can also be important in opposing landings.

AUTHOR: None

ORG: None

TITLE: "An Oil-Saving Ship's Stove"

SOURCE: Beijing JIANCHUAN ZHISHI [KNOWLEDGE OF SHIPS] in Chinese No 9, 20 Dec 80 pp 40-41, 11

ABSTRACT: The model 4806 ship's stove is now undergoing testing. Its improvements include replacement of the previous natural ventilation, improved weather stability, an increase in the thermal efficiency from 30 percent to 40 percent, faster heating and longer life (2 years instead of 1-3 months). A new conical air intake design improves air flow to the burner. Three different combustion chamber modifications are available.

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